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3400 Forest Pest Management

Top Damage in Douglas-fir Plantations Quinalt Ranger District

Forest Supervisor, Olympic NF

On April 2 and 3, Gregory M. Filip, Plant Pathologist, and Dave Bridgwater, Entomologist, from Forest Pest Management at the Regional Office, visited three Douglas-fir plantations on the Quinalt Ranger District. Purpose of the examination was to determine cause of top damage, primarily in Douglas-fir. They were accompanied by Ernie Meisenheimer, Forest Silviculturist; Floyd Freeman, District Prescription Forester; and Chuck McDonald, TSI Technician.

The first plantation they visited (H-8) is 35 years old and planted with off-site Douglas-fir. Some naturally established western hemlock also occurs. The Douglas-fir and occasionally the hemlocks had two types of forking. Some trees had an open fork or pronounced crook because of top breakage as a result of snow ice loads. These tops were 2 to 4 inches in diameter at the break, and one tree that was felled had yellow-brown top rot caused by Fomitopsis cajanderi. This rot is easily recognized by the rose-colored conks that form in breaks. Broken tops may have been partially girdled by animals, causing a wound that decayed and eventually broke at that point.

Another type of forking resulted when the terminal leader was killed and two laterals became the terminals. This type of tight forking was very common and some trees had four or five forks throughout the stem. Such trees are practically worthless for sawlogs. Plantation H-8 had so many forks that the District is considering abandoning commercial thinning, since almost no merchantable material is available. This is particularly unfortunate since the site class is High II and future yields will be considerably lower than expected.

The second plantation (G-19) is 30 years old and planted with mostly off-site Douglas-fir. Only the second type of forking, the tight forks, was observed in this plantation. Again, several trees had four or more forks in the same tree.

The third plantation (G-96) is 9 years old and planted with Douglas-fir from a local seed source. However, a dense understory of hemlock and spruce was present in most of the plantation. Some killing of terminal shoots, mostly last season, was evident throughout the plantation as were lammis shoots or second flushing which can result in multiple leaders. Cause of the terminal mortality was not attributed to any one agent. Animals, birds, frost, and Sirococcus tip blight are suspected causes of damage. Some dead terminals were collected and cultured to identify suspected pathogens. Except for Sitka spruce weevil (Pissodes strobi) damage, no other insect-caused damage was observed.

The question is whether the terminal death and lammas shoots occurring in young plantations, such as G-96, result in the top damage observed in older plantations, such as H-8 and G-19. In a survey conducted by Gerald Hoyer from the Department of Natural Resources in June 1983, 23 percent of 26 plantations in the Quinault Unit had serious top damage identified as multiple leaders, deformed stems, double boles, and broken tops. This study could not determine if terminal death in young stands leads to serious economic losses in older stands. However, the report did recommend that Douglas-fir not be planted on certain soil groups, especially where leader damage in adjacent plantations exceeded 25 percent. Another question arises as to whether Douglas-fir should be grown on sites such as plantation G-96 which has an abundance of hemlock and spruce natural regeneration and no Douglas-fir in the surrounding old-growth stand.

We recommend that the Quinault RD review their plantation exam records with the objective of determining possible correlations between damage incidence and seed source, ecotype, site class, soil type, and elevation. Such correlations may be used to dictate Douglas-fir management on the District. FPM personnel are available to assist the District in examining existing plantation records and making additional surveys to determine specific damage incidence if existing records are not adequate. We also recommend that long-term plots be established in several young plantations to monitor the progress of terminal damage over several years.

If FPM can be of any further assistance, please contact us.

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